Title: Episode 7: Cerebellar ataxia: neurophysiology, assessment and treatment with Amy Bastian

Description: In this episode, host, Parm Padgett geeks out about the cerebellum with Dr. Amy Bastian of the Kennedy Krieger Institute. It is chock full of clinical pearls and bottom lines! You will hear one of our preeminent researchers of the cerebellum discuss how the cerebellum influences movement, neuroplasticity of the cerebellum, clinically how to be most effective with patients with cerebellar dysfunction and how the cerebellum and proprioception are tied together. You may need to listen more than once!

Guest information

Amy J. Bastian, PT, PhD
Chief Science Officer, Director of Motion Analysis Laboratory at Kennedy Krieger Institute
https://www.kennedykrieger.org/patient-care/faculty-staff/amy-bastian

Motion Analysis Laboratory: https://www.kennedykrieger.org/research/centers-labs-cores/motion-analysis-laboratory

***on Facebook/Twitter: Let us know if you or your lab are on social media!

Some pearls to listen for in the podcast:

5:50 Dr. Bastian tells us how the cerebellum influences movement
7:00 How the cerebellum helps us live in the 'present' even though everything you are see, feel, and hear has already happened.
10:10 How cerebellar tuning works in healthy adults...errors, not perfection.
13:55 Why cerebellar tuning is difficult for people with cerebellar dysfunction
19:20 The skinny on neuroplasticity, prognosis, and the cerebellum...and a few other things Dr. Bastain wants every clinician to know.
25:20 Clinically what to think about...it has to be challenging!
32:50 Proprioception in a healthy brain vs one with cerebellar dysfunction
36:15 The bottom line re: proprioception in people with cerebellar dysfunction
38:55 Dr. Bastain shares some of her upcoming research

Referenced articles

** Deep cerebellar nuclei & prognosis- is there a reference for this?**

Keller JL, Bastian AJ (2014). A home balance exercise program improves walking in people with cerebellar ataxia. Neurorehabil Neural Repair. 28(8), 770-8.

Küper, M., Döring, K., Spangenberg, C., Konczak, J., Gizewski, E. R., Schoch, B., & Timmann, D. (2013). Location and restoration of function after cerebellar tumor removal--A longitudinal study of children and adolescents. The Cerebellum, 12(1), 48-58

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Therrien AS, Wolpert DM, Bastian AJ. Effective reinforcement learning following cerebellar damage requires a balance between exploration and motor noise. Brain. 2016 Jan;139(Pt 1):101-14. doi: 10.1093/brain/awv329.

Weeks HM, Therrien AS, Bastian AJ (2016). Proprioceptive Localization Deficits in People With Cerebellar Damage. Cerebellum.

Weeks HM, Therrien AS, Bastian AJ (2017). The cerebellum contributes to proprioception during motion. J Neurophysiol. , jn.00417.2016.

Related links
Thomas Thatch memorial: https://source.wustl.edu/2014/07/obituary-w-thomas-thach-jr-professor-emeritus-of-neurobiology-77/

*** You mentioned your lab is developing better quantitative measurements of perception of where you are during movements, rather than in just static or passive situations (like current neuro testing). Is there somewhere listeners could go to learn more?

Related articles
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Gibo TL, Criscimagna-Hemminger SE, Okamura AM, Bastian AJ (2013). Cerebellar motor learning: are environment dynamics more important than error size? J Neurophysiol. 110(2), 322-33

Kumari N, Taylor D, Signal N. The Effect of Cerebellar Transcranial Direct Current Stimulation on Motor Learning: A Systematic Review of Randomized Controlled Trials.
Front Hum Neurosci. 2019 Oct 4;13:328.

Rondi-Reig L, Paradis AL, Lefort JM, Babayan BM, Tobin C. How the cerebellum may monitor sensory information for spatial representation. Front Syst Neurosci. 2014 Nov 4;8:205. doi: 10.3389/fnsys.2014.00205. eCollection 2014.

Synofzik M, Ilg W. Motor training in degenerative spinocerebellar disease: ataxia-specific improvements by intensive physiotherapy and exergames. Biomed Res Int. 2014;2014:583507. doi: 10.1155/2014/583507. Epub 2014 Apr 27.